FIRST-TERM EXAM
JAN 2026

جامعة دمياط
Damietta University

Program: Biological Oceanography — **المستوي الثالث/ برنامج علوم البحار البيولوجية**
Analytical Chemistry of Sea Water (301 B.O.) — **كيمياء تحليلية لماء البحر**

Department: Zoology	Mark: 90	Time: 2 Hours	Date: 5/1/2026

Answer the Following Questions:

Question One: (20 Marks/ 2 each)

A- Complete the following statements with the suitable scientific word:

1. The fraction of organic carbon retained on the filter is known as ……..
2. Dissolved organic matter (DOM) includes not only carbon but also other elements such as ……
3. DOC originating within a water body is termed …….. DOC, while DOC originating outside the water body is called …….. DOC.
4. The biodegradable fraction of DOC that can be utilized by heterotrophic bacteria is called ……..
5. Dissolved organic carbon (DOC) is operationally defined as organic carbon that passes through a filter with a pore size between …….. and …….. µm.
6. Recalcitrant DOC is also referred to as …….. DOC.
7. The colored fraction of dissolved organic carbon that absorbs UV and blue light is known as ……..
8. In freshwater systems, DOC usually constitutes about …….. % of total aquatic organic carbon.

Question Two: (25 Marks)

A- Identify and briefly define the following ecological terms related to aquatic and coastal ecosystems: **(15 marks)**

a) Lagoons

b) Carbon sequestration

c) Kelp forests

B- Compare and contrast Green, Blue, Black, and Brown carbon with respect to their sources, capacity for carbon storage, and impacts on the environment and climate system. **(10 marks)**

Question Three: (25 Marks)

A- Indicate whether the following sentences are true or false and correct the false ones:

(15 marks /3 each)

1. DOC and DOM are exactly the same and always represent the same quantity. ( )
2. Recalcitrant DOC can persist in the ocean for thousands of years. ( )
3. BDOC concentrations are generally higher in first-order streams than in higher-order streams. ( )
4. Hydrophobic DOM molecules are retained in soils for shorter periods than hydrophilic molecules.( )
5. Photodegradation always decreases DOC bioavailability. ( )

B- Using the DOC pool spectrum, mention how dissolved organic carbon fractions differ in terms of turnover time and global carbon storage, from labile to recalcitrant DOC.

Question Four: (20 Marks)

A- Explain the principles of operation of:

1- Tangential Flow Filtration and Split-Flow
2- Thin Cell Fractionation
3- Pyrolysis-gas chromatography/mass spectrometry
4- Direct temperature-resolved mass spectrometry

and discuss their main applications and advantages for the separation and characterization of dissolved and colloidal matter in aquatic and environmental research.

انتهت الاسئلة

With Best Wishes

Dr. Shimaa Kteeba **Prof. Dr. Lamiaa Deef** **Prof. Dr. Nahed Omar**

Head of Department: Prof. Dr. Ayman Hyder